SEA-LEVEL RISE IMPACTS AND SALT MARSH CHANGE IN THE NEW YORK CITY VICINITY

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Sea level in New York increased by 2.77 mm per year (22 to 39 cm overall) during the 20th century, nearly double the global mean rate. Projections based on climate model simulations and historic tide gauge data suggests that regional sea level could rise by another 24 to 108 cm by the 2080s. Resulting coastal flood levels from future storms would be higher, cover a broader area, and occur more frequently. The 100-year flood could have a likelihood of recurring as frequently as approximately once every 20 years by the 2050s and every four years by the 2080s.

We analyzed salt marsh change at Marshlands Conservancy, a wildlife sanctuary in Rye, New York. A comparison of historic aerial photographs and field observations revealed several trends, including: 1) complete submergence or "drowning" of marsh segments, 2) marsh loss along tidal inlets terminating in enlarged pools 3) gradual slumping of peat, marsh retreat and fragmentation, and 4) die-back of *Spartina alterniflora* vegetation.

Many of New York's wetlands have experienced large-scale anthropogenic modifications that could have initiated marsh deterioration. Unrelated to dredge and fill activity, reduction in marsh size of 20% to 60% has been found in the region particularly where inland migration of salt marsh extent is severely limited by urban infrastructure such as in the marshes of Jamaica Bay, Queens, NY.

Work is in progress to determine if marsh submergence has occurred at other selected New York City salt marshes using comparisons of historic and current aerial photographs. Policies are also being explored to better monitor and manage salt marsh resources through city, state and federal initiatives. While the exact causes remain unknown, relative sea-level rise may thus far be simply exacerbating other anthropogenic effects; however, given the future rate of rise, and limitations on the rate of accretion known to occur in marshes, sea-level rise may be the predominant cause of marsh loss in the next decades. Future sea-level rise combined with stronger storm surges will likely increase the vulnerability of urban intertidal marshes. In order to ensure marsh survival, salt marsh preservation will increasingly not be a sufficient policy, but will need to be accompanied by monitoring, management and enhancement of these valued wetland resources.

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